



**CENTRAL POLLUTION CONTROL BOARD
ZONAL OFFICE (SOUTH), BENGALURU**

**REPORT ON MUNICIPAL SOLID WASTE MANAGEMENT &
PROCESSING FACILITY AT KOCHI, KERALA**

1. About the city

Kochi (also known as Cochin) is a major port city on the west coast and is part of the district Ernakulum. As per Census 2011, it has a population of 2.2 million making most densely populated city in the state, which is the largest urban agglomeration in Kerala State. The area constituted on the basis of census data 2011, consists of Corporation of Kochi, 9 municipalities, 14 Panchayats and parts of 4 Panchayats. The 9 municipalities are Thrippunithura, Maradu, Thrikkakara, Kalamassery, Eloor, North Paravur, Perumbavoor, Aluva and Angamali.

The Existing Solid Waste Disposal Facility (MSWDF) at Brahmapuram, Kochin was developed under Jawaharlal Nehru National Urban Renewal Mission (JNNURM) by Andhra Pradesh Technology Development Corporation (APTDC) at a cost of Rs.19.63 during 2007.

2. Collection of Municipal Solid Waste

The solid waste generated in the Kochi city from various sources is being collected by municipality. The “door to door” collection of domestic waste is done by various agencies (mainly by Kudumbasree & private agencies) at a charge of Rs. 60 / house. The city is divided into 9 municipalities and out of which municipal waste generated from 5 municipalities namely Kochi Corporation, Thrikkakara Municipality, Thrippunithura municipality, Maradu, Aluva municipality and Kalamassery municipality are being received by MSW, Brahmapuram, Kochi facility for processing of municipal solid waste, composting and landfill.

On the day of inspection **11.12.2013**, it was observed that the quantity of municipal received by the facility was 96.780 MT in a 27 trips of vehicle from 12.30 Hrs. to 16.15Hrs. The unit has Weigh Bridge to record the quantity of solid wastes received and vehicle details, time of arrival are maintained in a record.

3. Transportation of municipal solid waste

Out of 47 vehicles, 23 vehicles are owned by corporation for collecting and transporting the solid waste to the process site. As per information on 11.12.2013, the MSW

transported (net weight) varies from about 1.5 ton to 6.00 tons per trip, depends upon the capacity of truck & collection.

4. Processing of municipal solid waste

The Kochi Municipal Corporation (North Section) has made an agreement with M/s Environ Green Ltd., for treatment and disposal of municipal solid waste during February 2012. The MSW dumpsite is located at Brahmapuram, Kochi. The plant is receiving 90 to 212 TPD of MSW as per November 2013 record which is less than the installed capacity i.e. 250 TPD. The collected and transported MSW to the facility is initially weighed by weighing bridge which is located at the entrance of the dumpsite and then it is stored in composting yard. The MSW is taken for composting process and the final product compost is sold for consumers. The finished composting production for the month of November 2013 is as follow:

- Solid waste processed : 1890 Tons
- Semi manure (50%) : 945 Tons
- Total rejection (30%) : 567 Tons
- Finished compost (20%) : 378 Tons

The unit collects Rs. 550 per ton as tipping fee from the municipality, Rs. 26,09,461 is charged for processing 4744 Tons of waste in the month of November 2013.

5. Disposal of Non- bio degradable waste

The Kochi Municipal Corporation engaged M/s Bharat Traders for manual separation of Plastic wastes from the MSW. The unit informed that about maximum of 25 Tons plastic wastes are received along with MSW. The M/s Bharat Traders segregate only about 3 tones per day of plastic waste reaming all ends up in MSW rejection and for landfilling. M/s Bharat Traderes is paying Rs. 1.5 /Kg of plastic waste to Corporation. The unit claims that all rejection is landfilled in 8000 m² area landfill.

6. Leachate Treatment system

The leachate collection system, drainage system provided for totally collapsed. There is no proper maintenance & operation of the system. Housekeeping of area is very poor.

7. Other observations

- The facility is provided with proper gate and security to monitor the incoming vehicles etc. and protected to prevent entry of unauthorised persons / animals. This waste processing/ disposal facility include composting and landfill; it does not comprise incineration, palletisation and energy recovery.

- The facility is provided with approach and internal roads for free movement up to compost area. The internal roads are to be paved and the existing storm water drains are totally collapsed not in a position to repair. The entire system to be reconstructed.
- The waste storage area is provided with shed, but due to poor design & construction, the sheds have collapsed at many places and not repaired and maintained. This facility is developed with a fund of Jawaharlal Nehru National Urban Renewal Mission.
- The unit started receiving solid wastes from Kochi Municipal Council by APDTC since 2009. APDTC operated the facility for a Year and subsequent two years operated by Centre for Environment and Development (CED). Presently operated by M/s Environ Green Ltd since February 2012. The plant is designed to receive 250 TPD, whereas the unit is receiving less than the designed.
- The garland drains provided compost yard is damaged fully, leachate are poorly managed. There is no leachate treatment system, the entire leachate is utilised for plantation.
- The team also collected the finished compost to check the specifications for compost. The analysis results are given below:

Analysis Results of Finished Compost

S. No.	Parameter	Unit	Results
1.	Org. Carbon	%	17.4
2.	Nitrogen	%	1.9
3.	C/N ratio	-	9.2
4.	pH	-	6.6
5.	Moisture	%	22.7
6.	Phosphate	mg/gm	0.015
7.	Potassium	mg/gm	10.6
8.	Copper	mg/kg	417.3
9.	Cadmium	mg/kg	1.3
10.	Chromium	mg/kg	39.5
11.	Iron	mg/kg	5177
12.	Manganese	mg/kg	129.9
13.	Nickel	mg/kg	31.8
14.	Lead	mg/kg	37.6
15.	Zinc	mg/kg	477
16.	Cobalt	mg/kg	3.6

- The parameter with respect to copper is exceeding the standard in finished compost.
- The finished compost is marketed in the name of Enviro Green City Compost in 50 kg bags. This is sold at the rate of Rs. 5 per kg.
- The relevant Photographs are attached as **Annexure 1**.

8. Recommendations

- To repair the existing sheds provided for composting and replacing the damaged roofs. Also clear the plantation inside the shed area and drain area.
- To reconstruct the existing drains with proper system for collection of leachate and treatment of the same.
- To improve the segregation of non-biodegradable waste for incinerable / non-incinerable waste (inert) so as to reduce the quantity of waste going for landfill purpose.
- To stop dumping of recyclable / incinerable wastes into the landfill and to explore the possibility with cement plants for co-processing of the same.
- To stop dumping / storing of municipal solid waste in open place and utilise the shed area optimise for composting.
- To pave all the internal roads and develop storm water drain on the both side of the road.
- To reconstruct and maintain the leachate treatment system.
- To improve the house keeping in process area and composting area.
- To meet the prescribed compost quality standards w.r.t Copper, to ensure safe application of compost.

9. Inspection Team & Date of Inspection

1. Mr. G.Thirumurthy, EE
2. Mr.Deepsh.V., SSA

Date of Inspection: 11.12.2013

Photographs of MSWDF at Brahmapuram, Kochin



Fig.1 : Weigh Bridge at the entrance

No.	Vehicle No.	Vehicle Type	MSW Qty (kg)	MSW Qty (ton)
1	KL 10 1234	Truck	12000	12.00
2	KL 10 5678	Truck	8000	8.00
3	KL 10 9012	Truck	15000	15.00
4	KL 10 3456	Truck	10000	10.00
5	KL 10 7890	Truck	9000	9.00
6	KL 10 2345	Truck	11000	11.00
7	KL 10 6789	Truck	13000	13.00
8	KL 10 0123	Truck	7000	7.00
9	KL 10 4567	Truck	14000	14.00
10	KL 10 8901	Truck	16000	16.00

Fig.2 : Log book showing the vehicles & quantity of MSW brought to the facility



Fig.3 : Shed used for MSW storage



Fig.4 : Collapsed shed



Fig.5 : collapsed structures



Fig.6 : Excess MSW stored in open place



Fig.7 : No proper drain for leachate carrying, Kaccha drain



Fig. 8: Damaged drains, plantation done inside the shed area too.



Fig.9 : Entire Leachate is used for land application



Fig.10 : Compost processing area



Fig.11 : Old landfill with gas venting system



Fig.12 : Finished Compost for sale